

BORISOVA, Ye.I.

Reliability of basic atmospheric processes in January. TRUDY
TSIP no.115:5-17 '62. (MIRA 16:6)

(Weather forecasting)

BORISOVA, Ye.I.; MENDEL'SON, M.M.; MOGORAS, S.S.; KULAKOV, G.P.

Electrocardiographic changes in disorders of electrolyte metabolism.
Kardiologiya 3 no.6:59-64 N-D '63. (MIRA 17:6)

1. Iz kafedry urologii (zav. - zashluzhennyy deyatel' nauki prof.
A.P. Frumkin [deceased]) TSentral'nogo instituta usovershenstvovaniya
vrachey i otdeleniya funktsional'noy diagnostiki (zav. - kand. med.
nauk Ye.I. Borisova) bol'nitsy imeni S.P. Botkina (glavnyy vrach -
dotsent Yu.G. Antonov).

BORISOVA, Y.E.M.

USSR/Soil Science. Mineral Fertilizers.

I-5

Abs Jour: Referat Zh-Biol., No 6, 25 March, 1957, 22475

Author : Kornilov, M.F., Borisova, Y.E.M., Trunina, Z.V.

Inst :

Title : Soil Liming and Varieties.

Orig Pub: Tr. Vses. n.-i. in-ta udobr., agrotekhn. i agropochvoved., 1955,
No 31, 202-250

Abstract: Based on vegetative and field-laboratory experiments with different varieties of a number of agricultural plants conducted in the Leningrad division of the All-Union institute of fertilizers, agrotechnique and agrosoil science, it was established that varieties grown on neutral soils, rich in calcium, are more responsive to liming when grown on acid soils than varieties grown in districts further north on acid soils. These differences in behavior of varieties were mostly observed in summer wheat, barley, flax, peas, clover, and were less clearly expressed in summer

Card : 1/2

-1-

USSR/Soil Science. Mineral Fertilizers.

I-5

Abs Jour: Referat Zh-Biol., No 6, 25 March, 1957, 22475

rye, vetch, buckwheat. Sensitivity to soil acidity of different
oat varieties had no connection with their origin.

Card : 2/2

-2-

S/076/62/036/006/001/011
B101/B144

AUTHORS: Borisova, Ye. N., and Yereimin, Ye. N.

TITLE: Mechanism of the conversion of methane into acetylene in electric discharges. I. Kinetics of the conversion of methane and ethylene in the glow discharge

PERIODICAL: Zhurnal fizicheskoy khimii, v. 36, no. 6, 1962, 1261-1268

TEXT: A study was carried out of C_2H_2 formation from CH_4 or C_2H_4 , using a quartz discharge tube of 25 mm diameter and with 25 cm distance between the electrodes, at 28 and 38 mm Hg pressure and consuming 0.40 - 0.41 kw. Measurements were made of the discharge power $U = 0.7 \cdot IE$ (w), the flow rate v of the gas (liters/hr), the specific energy U/v (w·hr/liter), the expansion coefficient β of the gas, the energy consumption α per liter of C_2H_2 (w·hr/liter of C_2H_2), the total conversion (Δ for CH_4 , Δ' for C_2H_4), and the degrees of conversion:

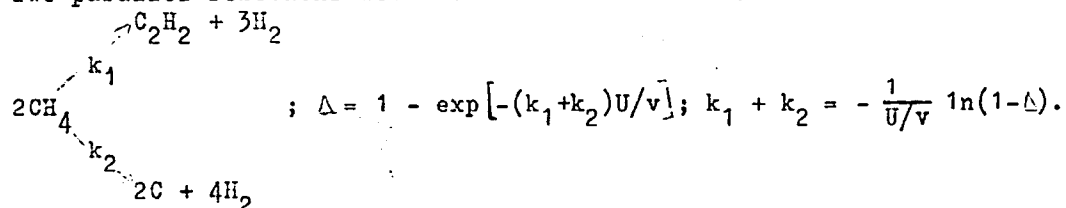
$$\gamma = 2\beta [C_2H_2] / [CH_4]_0; \gamma' = \beta [C_2H_2] / [C_2H_4]_0, \text{ and } \gamma'' = 2\beta [C_2H_4] / [CH_4]_0.$$

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S/076/62/036/006/001/011
B101/B144

Mechanism of the

Two parallel reactions were assumed for methane:.



Similar equations hold for ethylene. Results at 29 mm Hg: (1) When CH_4 is electrocracked, the C_2H_2 percentage increases rapidly, reaches a maximum of 17.4% at $U/v = 14.5$ w·hr/liter, then decreases very slowly. With C_2H_4 , the C_2H_2 maximum of 34.8% is reached at 10.7 w·hr/liter, followed by a rapid decrease. (2) γ_{max} and γ'_{max} versus U/v are almost equal; $\Delta' > \Delta$. (3) Decomposition and polymerization are much more intensive with C_2H_4 than with CH_4 : more carbon black and tar are formed. (4) When CH_4 is cracked, C_2H_4 also forms, with a maximum of 5% at 3 - 5 w·hr/liter.

Card 2/3

S/076/62/036/006/001/011
B101/B144

Mechanism of the...

(5) For CH_4 the value of $k_1 + k_2$ is 0.1033 and for C_2H_2 it is 0.1659 liters/w·hr, thus differing by a factor of 1.5 only. At 38 mm Hg, this value was 0.1872 liters/w·hr for CH_4 and no more than 4% C_2H_4 formed at 34 - 36 mm Hg, $k_1 + k_2$ came to only 0.1040 liters/w·hr for C_2H_4 . From these results it is concluded that C_2H_2 cannot be the only or even the main substance resulting from the intermediate product C_2H_4 when CH_4 is electrocracked. There are 7 figures and 2 tables. The most important English-language reference is: H. Wiener, M. Burton, J. Amer. Chem. Soc., 75, 5815, 1953. ✓

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova
(Moscow State University imeni M. V. Lomonosov)

SUBMITTED: August 9, 1960

Card 3/3

BORISOVA, Ye.N.; YEREMIN, Ye.N.

Mechanism of the conversion of methane to acetylene in electrical discharges. Part 2. Zhur. fiz. khim. 36 no.11:2334-2339 N'62.
(MIRA 17:5)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

BORISOVA, Ye.N., aspirant

Natural lead content of soil and food products. Kaz.med.zhur. 40
no.4:88-90 J1-Ag '59. (MIRA 13:2)

1. Iz kafedry obshchey gigiyeny (zaveduyushchiy - prof. V.V. Milos-
lavskiy) Kazanskogo meditsinskogo instituta.
(MINERALS IN SOIL) (MINERALS IN FOOD) (LEAD)

BORISOVA, Ye. N., Cand Med Sci -- (diss) "Study of the natural content of lead in soil and in edible products." Kazan', 1960. 12 pp; (Ministry of Public Health RSFSR, Kazan' State Medical Inst, Chair of General Hygiene); 200 copies; price not given; (KL, 17-60, 167)

BORISOVA, Ye.N.

Lead content of soils and foodstuffs. Trudy Biogeokhim. Lab. no.11:
221-223 '60. (MIRA 14:5)

1. Kazanskiy meditsinskiy institut.
(MINERALS IN FOOD) (LEAD)

BORISOVA, Ye.N.

Histochemical reaction for lead with dithizone in food products.
Vop.pit. 19 no.4:85-86 J1-Ag '60. (MIRA 13:11)

1. Iz kafedry obshchey gigiyeny (zav. - prof. V.V. Miloslavskiy)
Kazanskogo meditsinskogo instituta.
(LEAD-ANALYSIS) (FOOD-ANALYSIS)

BABUSHKINA, M.I., kand.tekhn.nauk; PISHCHURNIKOV, A.F., inzh.; ZITSER, Z.I.,
inzh.; VULKOVICH, Z.M., inzh.; BORISOVA, Ye.S., inzh.

Roof tiles from glass and sand. Stroi.mat. 9 no.9:30 S '63.
(MIRA 16:10)

BORISOVA, E. E.

AID P - 2623

Subject : USSR/Meteorology
Card 1/1 Pub. 71-a - 26/26
Author : Borisova, E. E.
Title : ~~Second Spartakiad~~ of hydrometeorological technicum
students
Periodical : Met i gidr, 4, 63, J1/Ag 1955
Abstract : The article reports on students sport competitions
held in Moscow in July, 1954.
Institution : None
Submitted : No date

BORISOVA, Ye.Ye.

Odontoma of the maxilla. Stomatologiia 40 no.3:108 My-Je '61.
(MIRA 14:12)

1. Iz stomatologicheskoy polikliniki No.14 Moskvy (glavnyy vrach
T.M.Golovina).

(JAWS---TUMORS)

BORISOVA, Yu. F., assistant

Some functions of the liver in different disorders of the
menstrual cycle. Akush. i gin. no.4:33-37 '62. (MIRA 15:7)

1. Iz kafedry akusherstva i ginekologii I Moskovskogo ordena
Lenina meditsinskogo instituta (sav. - prof. K. N. Zhmakin) i
Nauchno-issledovatel'skogo instituta akusherstva i ginekologii
(dir. - O. V. Makeyeva) Ministerstva zdravookhraneniya RSFSR.

(LIVER) (MENSTRUATION)

BORISOVA, Yu. F.

Sexual development of schoolgirls in Moscow. Akush. i gin.
40 no.5:105-110 S-O '64. (MIRA 18:5)

1. Kafedra akusherstva i ginekologii (zav. - prof. K.N.Zhmakin)
I Moskovskogo ordena Lenina meditsinskogo instituta imeni Sechenova.

(N) 1 12038-66 EWT(1)/EWT(m)/FOG/ENP(1) IJP(c) WH/CG/RM/GW

ACC NR: AT5028738 SOURCE CODE: UR/3175/65/000/023/0016/0019

44 55 44 55 44 55
AUTHOR: Borisova, Yu. P.; Dashevskaya, Ye. I.; Kozlov, A. N.

ORG: none

TITLE: Preparation and study of magnetometer absorption cells with double radiooptical resonance

44 55
SOURCE: USSR. Gosudarstvennyy geologicheskiiy komitet. Osoboye konstruktorskoye byuro. Geofizicheskaya apparatura, no. 23, 1965, 16-19

TOPIC TAGS: magnetometer, magnetic resonance

ABSTRACT: A method of filling absorption cells and depositing coatings on their inner surface in the preparation of potassium, rubidium, and cesium absorption chambers was developed at the Magnetic Laboratory (Magnitnaya laboratoriya) of the IZMIR AN SSSR. The experiment showed that the magnetic resonance signal obtained with coatings from long chain saturated hydrocarbons (e. g., tetracontane $C_{40}H_{82}$) is 1.5-2 times stronger than with alkylsilane coatings. The choice of hydrocarbon was determined by the working temperature of the absorption cell. Since the working temperature of the cesium magnetometer is 20°C, all high-molecular paraffins beginning with eicosane are suitable. In the rubi-

Card 1/2

L 12038-66

ACC NR: AT5028738

diu magnetometer, high molecular fractions with melting points of 60-
-114°C were studied. The procedure for joining the absorption chamber
to the vacuum unit and depositing the coating on the walls of the cham-
ber is described. Orig. art. has: 3 figures.

SUB CODE: 08,14/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 006

CC
Card 2/2

Borisova, Z. M.

✓ Preparation of protium and protium oxide. I. M. Yaki-
menko, A. I. Shatenshteyn, M. A. Rabinovich, E. A.
Yakovleva, Z. M. Borisova, and E. N. Zvyagintseva.
Zhur. Neorg. Khim. 2, 230-32 (1957); cf. C.A. 52, 2487g.
A continuous working app. consisting of a single electrolysis
step and a 10-step isotopic exchange assembly was designed
for the prep. of H^1 from water. Protium thus produced
contained <0.0001 atom % H^2 and was further allowed to
react with the O of the air to yield "zero water standard"
 H_2O . The 24-hr. capacity of the set-up was 0.5 l. H_2O .
This zero water standard was shown to be suitable for the
analysis of H^2 in natural waters and in the detn. of the value
of Dole's correction (C.A. 47, 124). Detailed diagrams of
the app. are given. A. P. Kutyba.

6

BORISOVA, Z.P.

~~Species of pests of perennial cereal grasses in Kharkov Province.~~ Zool.shur. 33 no. 6:1264-1270 N-D '54. (MIRA 8:2)

1. Khar'kovskiy sel'skokhozyaystvennyy institut.
(Kharkov Province--Insects, Injurious and beneficial)
(Grasses--Diseases and pests)

BORISOVA, Z. P.

USSR / General and Specialized Zoology. Insects. P
Insect and Mite Pests.

Abs Jour : Ref Zhur - Biol., No 10, 1958, No 44763

Author : Borisova, Z. P.

Inst : Kharkov Agricultural Institute.

Title : Pests in the Sprouts of Spring-Sown Cereal Grasses
and Measures for Their Control.

Orig Pub : Zap. Khar'kovsk. s. kh. in-ta, 1957, 13, (50),
189-194.

Abstract : No abstract given.

Card 1/1

5 (2)
AUTHORS: Shchukarev, S. A., Andreyev, S. N., SOV/79-29-8-2/81
~~Borisova, Z. U.~~

TITLE: On the Enthalpy of Dissolution of the Hexahydrate of Zinc Perchlorate.

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 8, pp 2468 - 2470 (USSR)

ABSTRACT: Exact data on the heat of the solution process of various crystallo-hydrates are material for the elaboration of the thermodynamic theory of the solubility of salts, as well as for the concept of the chemical nature of the crystal hydrates themselves. Nothing has hitherto been published on the heats of solution of the hexahydrate $\text{Zn}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}$, which is therefore the task of the present paper. Preparation and analysis of the above hydrate are described in detail. In the dissolution of this freshly precipitated hydrate, containing a small excess of mother liquor, comparatively low heats were obtained, as may be seen from figure 1. As was expected, this excess of mother liquor decreases numerically the endothermic effect of the solution of the salts, since the dilution of the saturated solution

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On the Enthalpy of Dissolution of the Hexahydrate of Zinc Perchlorate SOV/79-29-8-2/81

is an exothermic process. The hydrate desiccated within 24 hours contained 6 molecules of water and yielded a maximum heat of solution, its value approaching closely that obtained by the methods described above. This heat decreases numerically with further desiccation. The data given show that a minimum of dehydration, within the limit of error, leads to a considerable decrease of the heat of solution. The experimental data lead to the conclusion that the preparation desiccated within 24 hours is most useful for the determination of the heat of solution. The values obtained for this heat at various dilutions are shown in table 2 and in figure 2 (dilutions 1 : 1000 to 1 : 7). There are 2 figures, 2 tables, and 4 Soviet references.

ASSOCIATION: Leningradskiy gosudarstvennyy universitet (Leningrad State University)

SUBMITTED: June 10, 1958

Card 2/2

5.4700

77850
SOV/79-30-2-1/78

BA

AUTHORS:

Shchukarev, S. A., Borisova, Z. U., Baydakov, L. A.

TITLE:

Concerning Heat of Solution of Magnesium Perchlorate Hexahydrate

PERIODICAL:

Zhurnal obshchey khimii, 1960, Vol 30, Nr 2, pp 353-355(USSR)

ABSTRACT:

Heats of solution of $Mg(ClO_4)_2 \cdot 6H_2O$ for various dilutions at 25° were measured in a microcalorimeter [described in Mishchenko, K. P., Pronina, M. Z., et al., Zhur. priklad. khim. 27, 1003 (1954)]. Magnesium perchlorate, obtained by dissolving MgO in perchloric acid, was recrystallized 3-5 times and dried for 24 hr over concentrated sulfuric acid (the time of drying was determined by finding the maximum ΔH in the plot of ΔH vs time). Tables 1 and 2 list the experimental results (each is an average of ΔH found in 8-9 experiments. Figure 2 gives the graphical representation along with the ΔH for zinc perchlorate hexahydrate [Shchukarev, S. A., Andreyev, S. N., et al., Zhur. obshchey khim., 29, 2468 (1959)]. It can be seen that the limiting value for integral heat of dilution of the magnesium perchlorate hexahydrate equals 1.00 kcal/mole (reached at dilution 1:500). There are 2 figures;

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Concerning Heat of Solution of Magnesium Perchlorate
Hexahydrate

77850
SOV/79-30-2-1/78

2 tables; and 6 references, 3 Soviet, 1 Belgian, 2 U.S. The
U.S. references are: Smeets, Ch. A., 27, Nr 1, 5629 (1936); Smit,
Rees, Hardy, J. Am. Chem. Soc., 54, 3513 (1932).

ASSOCIATION:

Leningrad State University (Leningradskiy gosudarstvennyy
universitet)

SUBMITTED:

February 10, 1959

Table 1

Dilutions	ΔH_{av} (kcal/mole)
1: 1000	1.00 $\pm$ 0.03
1: 700	1.00 $\pm$ 0.03
1: 500	1.00 $\pm$ 0.03
1: 300	1.17 $\pm$ 0.03
1: 200	1.73 $\pm$ 0.03
1: 100	1.75 $\pm$ 0.03
1: 50	1.86 $\pm$ 0.03
1: 30	1.94 $\pm$ 0.03

Table 2

Dilutions	ΔH_{av} (kcal/mole)
1: 25	2.05 $\pm$ 0.02
1: 15	2.47 $\pm$ 0.02
1: 11	2.91 $\pm$ 0.02
1: 9	3.24 $\pm$ 0.02
1: 8	3.42 $\pm$ 0.02
1: 7	3.56 $\pm$ 0.02
1: 6.5	3.71 $\pm$ 0.02

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Concerning Heat of Solution of Magnesium Perchlorate
Hexahydrate

77850
SOV/79-30-2-1/78

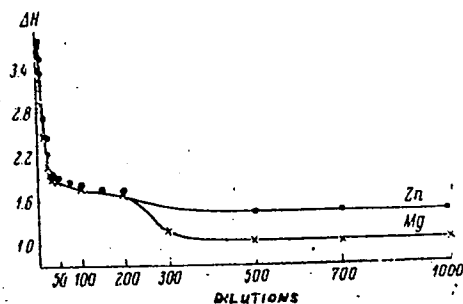


Fig. 2. Heats of dilution of hexahydrates of magnesium and zinc perchlorates at various dilutions.

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16(1) 16.4600 16.5400

68965

S/020/60/131/02/003/071

AUTHOR: Borisovich, Yu.G.

TITLE: Rotation of Slightly Continuous Vector Fields ¹⁶

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol 131, Nr 2, pp 230-233 (USSR)

ABSTRACT: For mappings in the bicomact topological spaces J.Leray [Ref1] introduced the notion of the complete index of the solutions. On this base the author introduces the notion of the rotation of a weakly continuous vector field $x-F(x)$ in the Hilbert space, where $F(x)$ is an operator which maps every weakly convergent sequence into an also weakly convergent sequence. The rotation of several concrete vector fields is calculated, where well-known results of Krasnosel'skiy, the theorem of fixed points of Schauder-Tikhonov etc. are generalized. As an application a theorem on the existence of an implicitly defined function is proved. Partially the results can be extended to functional spaces over separable Banach spaces, and they can be used for the proof of periodic solutions of differential equations. The author mentions Borsuk. He thanks M.A.Krasnosel'skiy for the attention to the paper. There are 2 references, 1 of which is Soviet, and 1 French. X

Card 1/2

Rotation of Slightly Continuous Vector
Fields

68965

S/020/60/131/02/003/071

ASSOCIATION: Voronezhskiy gosudarstvennyy universitet
(Voronezh State University)

PRESENTED: November 18, 1959, by P.S. Aleksandrov, Academician

SUBMITTED: November 6, 1959

X

Card 2/2

5.4120

78311
SOV/79-30-2-65/69

AUTHORS: Shchukarev, S. A., Borisova, Z. B., Orlova, G. M.

TITLE: Concerning Heats of Solution of Cobalt and Nickel Perchlorates Hexahydrates

PERIODICAL: Zhurnal obshchey khimii, 1960, Vol 30, Nr 3, pp 1053-1055 (USSR)

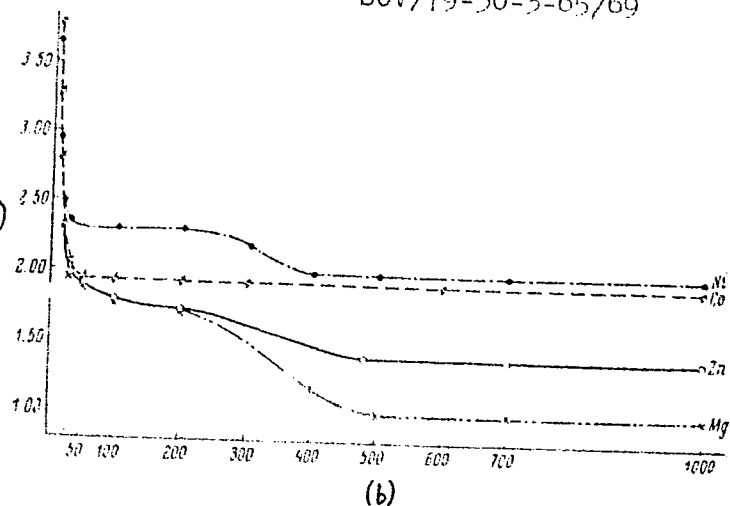
ABSTRACT: Heats of solution of $\text{Co}(\text{ClO}_4)_2 \cdot 6\text{H}_2\text{O}$ and $\text{Ni}(\text{ClO}_4)_4 \cdot 6\text{H}_2\text{O}$ in water, in a wide range of dilutions, were measured by the previously described method (S. S. Shchukarev and others, ZhOKh, 29, 2468 (1959); S. A. Shchukarev and others, ZhOKh, 30, 353 (1960)). The results obtained were compared with the previously published data on heats of solution of Mg and Zn salts. The results are given in the Fig. A. According to their endothermal effects of solution at infinite dilution, the investigated elements form the following series: $\text{Mg} < \text{Zn} < \text{Co} < \text{Ni}$. There are 1 table; 1 figure; and 4 Soviet references.

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Concerning Heats of Solution of Cobalt
and Nickel Perchlorates Hexahydrates

78511
SOV/19-30-3-65/69

Fig. A. Heats of
solution of Ni, Co, Zn,
and Mg perchlorate
hexahydrates, at various
dilutions. (a) ΔH_{avg}
Cal/mole; (b) dilution. (a)



ASSOCIATION: Leningrad State University (Leningradskiy gosudarst-
vennyy universitet)
SUBMITTED: July 6, 1959
Card 2/2

SHCHUKAREV, S.A.; ORLOVA, G.M.; BORISOVA, Z.U.

Heats of solution of copper perchlorate hexahydrate in
water and aqueous solutions of perchloric acid. Zhur.ob.
khim. 30 no.7:2097-2102 J1 '60. (MIRA 13:7)

1. Leningradskiy gosudarstvennyy universitet.
(Copper perchlorate) (Heat of solution)
(Perchloric acid)

SHCHUKAREV, S.A.; BORISOVA, Z.U.; GUSEV, A.M.

Heat of solution of cadmium and mercury perchlorates hexahydrates.
Zhur. ob. khim. 30 no.12:3857-3859 D '60. (MIRA 13:12)

1. Leningradskiy gosudarstvennyy universitet.
(Cadmium perchlorate) (Mercury perchlorate)
(Heat of solution)

MYULLER, R.L.; BORISOVA, Z.U.; GREBENSHCHIKOVA, N.I.

Kinetics of solution of arsenic selenide in an alkaline solution.
Zhur.prikl.khim. 34 no.3:533-537 Mr '61. (MIRA 14:5)
(Arsenic selenide)

MYULLER, R.L.; BORISOVA, Z.U.; IL'INSKAYA, O.V.

Chemical microheterogeneity of vitreous $\text{AsS}_{1.25}$. Zhur.prikl.khim.
34 no.3:690-691 Mr '61. (MIRA 14:5)
(Asenic sulfide)

30196

247700

1555 1043 1035
1385 3005

S/080/61/034/011/007/020
D227/D301

AUTHORS: Baydakov, L.A., Borisova, Z.U., and Myuller, R.L.

TITLE: Electrical conductivity of the selenium-arsenic system in a vitreous state

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 11, 1961, 2446 - 2454

TEXT: In the present work the authors studied the possibility of stabilizing the conductivity of selenium by interlocking it with chains of atoms of polyvalent metals. Among the latter class of elements arsenic and germanium proved to be of most interest. There are two ways in which arsenic affects selenium. During glass formation it may close the chains to give polycycles of the type As_4Se_{6n}

and therefore, block the current conductors or i^+ may form an open mesh $AsSe_{3n}$, ensuring "through" conductivity. Glass melts of selenium-arsenic of the type $SeAs_x$ where $0 \leq x \leq 1.25$ were obtained by the method of N.A. Goryunova and B.T. Kolomiyets (Ref. 11: Izv. AN SSSR ser.fiz. 20, 1496, 1956) according to which the two ele-
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S/080/61/034/011/007/020

D227/D301

Electrical conductivity of the ...

ments are fused in vacuum and kept at 680 - 700°C for 2 hours while subjected to vibration followed by slow cooling. Another series of samples was prepared without vibration but with additional heating to 280° over a period of 2 hours. Glasses of AsSe_y where $1.25 \leq y < 20$ were obtained, for which the temperature relation of the conductivity was reproducible and the values of energy ϵ and factor σ_0 in the expression $\sigma = \sigma_0 \exp(-\epsilon/2kT)$, were sufficiently near. X

The melts were characterized by their density "d" and microhardness H based on 1 mole per 1 cc. of structural elements. From the experimental results it was found that $\text{AsSe}_{1.5}$ had a maximum microhardness which indicated the presence of a meshlike polymeric compound. The uniformity of H, on the other hand, indicated the absence of compound As_2Se_5 .

Transition of $\text{AsSe}_{1.5}$ to As_2Se_2 was accompanied by the decrease of H and appearance of weak As-As bonds in As_2Se_2 structures. The conductivity of the investigated systems was measured by potentiometric method, if however, the resistances of specimens exceeded 10¹¹ ohms

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S/080/61/034/011/007/020
D227/D301

Electrical conductivity of the ...

ohms. A method of charging and discharging of a small condenser was used, in which the charge was allowed to leak through the insulation of the electrometric part of the system. The resistance was then calculated from the equation

$$R_x = \frac{V_p R_z}{V} (1 - e^{-\frac{t}{CR_z}})$$

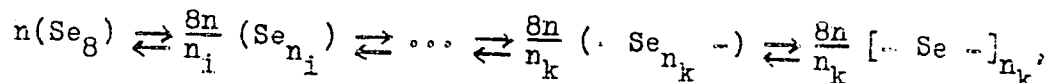
where V_p - potential across the specimen, V - potential across the condenser C at the time t , R_z - resistance of the insulation. Each specimen was subject to measurements involving comparison with a standard resistance and charge-discharge method. The absence of hysteresis was determined by taking measurements during temperature increase and decrease. From the measurements of temperature, electrical conductivity and evaluations of ϵ and σ , the following inferences were made: The electrical conductivity of selenium containing traces of admixtures is not stable due to the case, with which the structural transformation reaction

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S/080/61/034/011/007/020
D227/D301

Electrical conductivity of the ...



occurs, resulting from the shift of the complex multistage equilibrium and transformation of Se_8 and cyclic polymers characteristic of liquid Se, into disorderly and then orderly chain arrangements, the latter being characteristic of crystalline hexagonal selenium. The total number of covalent bonds is however retained and the shift of equilibrium proceeds with very small energy effects. The fact that conductivity varies within 10^{-15} to 10^{-5} is due in the first place to the rearrangement of rings, blocking the current carriers, into open chains ensuring transmission of voids and electrons, and is illustrated by the rapid decrease of electrical conductivity on fusion of the hexagonal selenium and analogous decrease on transition from hexagonal selenium ($-\text{Se}-$, $\sigma = 10^{-5} - 10^{-7} \Omega^{-1} \text{cm}^{-1}$) to monoclinic selenium (Se_8 , $\sigma = 10^{-15} \Omega^{-1} \text{cm}^{-1}$). The complex transitional structural and valency states of hard selenium at the various stages of heating occurs as a result of covalent bond interchange during the overlapping of electron spheres in the process

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S/080/61/034/011/007/020
D227/D301

Electrical conductivity of the ...

of rotation-vibration movement. As shown by the conductivity values the introduction of arsenic fixes the mesh-structure of high stability, exhibiting high hardness, high softening point and more stable conductivity. Optimum strength and conductivity is shown by a $\text{AsSe}_{1.5}$ compound having a maximum density of triple covalent bond packing. The increase of As content reduces the microhardness and as a result of weakening of the $\text{AsSe}_{1.5}$ structure conductivity begins to vary. There are 4 figures, 1 table and 40 references: 23 Soviet-bloc and 17 non-Soviet-bloc. The 4 most recent references to the English-language publications read as follows: C.H.L. Goodman, Phys. Chem. Solids. 6, 4, 305, 1958; S.S. Flaschen, A.D. Pearson and W.R. Nakthovers, J. Am. Cer. Soc. 42, 450, 1959; A.F. Joffe and A.R. Regel, Progress in Semiconductors, 4, 239, 1960; E. Mooser and W.B. Pearson, J. Electronics, 1, 629, 1956.

SUBMITTED: March 14, 1961

Card 5/5

37912

S/054/62/000/002/008/012
B101/B104

15.2640

AUTHORS: Myuller, R. L., Baydakov, L. A., Borisova, Z. U.

TITLE: Electric conductivity of the system As - Se - Ge in the vitreous state

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 2, 1962, 94 - 102

TEXT: Glasses having the composition $AsSe_xGe_y$ were investigated to establish the effects of the trigonal structure of $AsSe_3$ and of the tetrahedral structure of $=Se_2GeSe_2=$ on their microhardness and electric conductivity. To avoid formation of selenium rings or chains $x - 2y$ was chosen ≤ 1.5 . After chemical analysis the concentrations of the structural units $[GeSe_{4/2}]$; $[AsSe_{3/2}]$; $[AsSe_{2/2}]$; $[AsAs_{3/3}]$; and $[GeGe_{4/4}]$ in the glasses were calculated. Four types of glass were found: (I) with $x - 2y = 1.5$, i.e., containing enough Se for the unpaired electrons therein to form complete valence electron octets with the unpaired electrons of Ge and As. In this case $[GeSe_{4/2}]x = y[As]$, $[AsSe_{3/2}] = [As]$.

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Electric conductivity of the...

S/054/62/000/002/008/012
B101/B104

Type (II) with $1.0 \leq x - 2y < 1.5$, in which the structural units $[\text{AsSe}_{3/2}]$ and $[\text{AsSe}_{2/2}]$ are due to the low Se content. Type (III) with $0 \leq x - 2y < 1.0$ contains As which is not bound with Se, $[\text{AsAs}_{3/3}]$. In type (IV) with $x - 2y < 0$, there is not enough Se to bind all of the Ge, so the structural units $[\text{GeGe}_{4/4}]$ are formed. Microhardness H as calculated from the microhardnesses h_i of the structural units was in good agreement ($\pm 4\%$) with the rule of additivity $H = \sum h_i [x_i]$, where $[x_i]$ is the concentration of the structural units (SU). Assuming that $h(\text{AsSe}_{3/2}) \approx 6.0 \cdot 10^3 \text{ (kg/mm}^2\text{)(cm}^3\text{/mole SU)}$, the authors calculated $h(\text{GeSe}_{4/2}) \approx 12 \cdot 10^3$ for type (I), $h(\text{AsSe}_{3/2}) \approx 5 \cdot 10^3$ for type (II) and $h(\text{AsAs}_{3/3}) \approx 9 \cdot 10^3$, $h(\text{GeGe}_{4/4}) \approx 14 \cdot 10^3 \text{ (kg/mm}^2\text{)(cm}^2\text{/mole SU)}$ for types (III) and (IV). The electric conductivity, the modulus of electric conductivity, and the energy ϵ_σ , as determined by the authors are consistent with the valency theory of continuous electron transfer in $\text{GeSe}_{4/2}$ and

Card 2/3

Electric conductivity of the..

S/054/62/000/002/008/012
B101/B104

AsSe_{3/2}. The other SU were blocked. Carrier mobility is limited by disturbances in the periodicity of the covalent bonds and depends on which bonds predominate. This paper was read at the XX nauchnaya konferentsiya LISI (20th Scientific Conference of the LISI), February, 1962. There are 1 figure and 2 tables. The most important English-language reference is: L. Pauling, The nature of the chemical bond. 3 ed., N. Y., 1960.

SUBMITTED: January 12, 1962

Card 3/3

15.2640

43999
S/054/62/000/004/015/017
B101/B186

AUTHORS: Timofeyeva, V. N., Borisova, Z. V. U.
TITLE: Electrical conductivity of some glassy $\text{AsS}_x\text{Se}_y\text{Ge}_z$ compositions
PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii,
no. 4, 1962, 155-159.

TEXT: It was investigated whether the introduction of tetrahedral $[\text{GeS}_{4/2}]$ structural units in glassy $[\text{AsS}_{3/2}]$ increases the through conductivity of the current carriers and the $\log \beta$ which is -3.5 for $\text{AsS}_{3/2}$. It was found that the conductivity of glasses having the chemical composition AsS_xGe_z ($x = 1.7-4.5$, $z = 0.1-0.5$) leads to poorly reproducible values due to the complicated structure and the sensitivity to thermal treatment, in binary systems having the same composition. Partial substitution of Se for S, however, stabilizes the conductivity. The ionization energy, the energy of conductivity, and $\log \beta$ are given for the compositions:
 $\text{AsS}_{0.85}\text{Se}_{0.85}\text{Ge}_{0.1}$ 1.8, 2.0 ± 0.1 , -0.9; $\text{AsS}_{0.95}\text{Se}_{0.95}\text{Ge}_{0.2}$ 1.9, 2.0 ± 0.1 ,

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S/054/62/000/004/015/017
B101/B186

Electrical conductivity, of some...

-1.5; $\text{AsS}_{1.25}\text{Se}_{1.25}\text{Ge}_{0.5}$ 1.9, 2.4 ± 0.1 , +0.1; $\text{AsS}_{1.75}\text{Se}_{1.75}\text{Ge}_{2.0}$,
 2.3 ± 0.1 , +0.1; $\text{AsS}_{2.25}\text{Se}_{2.25}\text{Ge}_{1.5}$ 2.0, 2.0 ± 0.1 , -2.2. Introduction of
 $[\text{GeS}_{4/2}]$ structural units thus caused through conductivity, and $\log \beta$
 increased to -1.5. The low value $\log \beta = -2.2$ of the composition
 $\text{AsS}_{2.25}\text{Se}_{2.25}\text{Ge}_{1.5}$ has not been clarified and requires further investigation.
 There are 3 figures and 3 tables.

SUBMITTED: June 1962

Card 2/2

L4000

S/054/62/000/004/016/017
B101/B186

152640
AUTHORS: Borisova, Z. U., Bobrov, A. I.

TITLE: Electrical conductivity of the glassy system arsenic - selenium - gallium

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 4, 1962, 159-164

TEXT: The effect of gallium and indium on the conductivity of glassy AsSe_x was studied. Only loose, porous melts were obtained in the system AsSe_xIn_y with $y = 0.05$ and $y = 0.1$. The system AsSe_xGa_y yielded glassy melts in the range $0 \leq y \leq 0.15$. Melts that did not become glassy by slow cooling were made glassy by quenching in air, but some samples ($y > 0.05$) included some amount of crystalline phase. Experiments with melts of the composition $\text{AsSe}_{2-0.05}^{\text{Me}_{0.05}}$, Me = Cu, Ag, Tl, showed no effect of these metals on the conductivity of AsSe_xGa_y . Introduction of gallium in glassy AsSe_x increased the conductivity by 2-3 orders, the energy of conductivity not

Card 1/2

Electrical conductivity of the...

S/054/62/000/004/016/017
B101/B186

changing and being near the dissociation energy of the As-Se bond (1.7 ev). Introduction of gallium brings the modulus of conductivity close to the theoretical value ($\log \beta \sim 0$) due to stabilization of the through transfer of current carriers by formation of the tetrahedral structural units

$\geq \text{Se}_{3/2}\text{As}^+ - \text{Se-Ga}^-\text{Se}_{3/2} \leq$. This eliminates the blocking of current carriers in the complex structures of the excess selenium. There are 1 figure and 2 tables.

SUBMITTED: February 17, 1962

Card 2/2

44001

S/054/62/000/004/017/017
B101/B186

152670

AUTHORS: Borisova, Z. U., Il'inskaya, O. V., Chin Chang

TITLE: Dissolving rate of glassy AsSe_x as a function of the concentration of the alkali solution

PERIODICAL: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 4, 1962, 165-167

TEXT: Glasses of the compositions $\text{AsSe}_{1.25}$, $\text{AsSe}_{1.5}$, and $\text{AsSe}_{2.5}$ were dissolved in 0.1 N, 0.2 N, 0.5 N, and 1 N NaOH. The dissolving rate $w = \Delta g / sM\Delta t$ was determined, where Δg is the amount (in g) dissolved in the time Δt , sec, s the sample surface (cm^2), and M the molecular weight of the structural unit of AsSe_x . The function $\log w = -A/T + B$ was found, which was little affected by stirring. Hence, $C = N \cdot 10^B$ structural units/ $\text{cm}^2 \cdot \text{sec}$ was calculated and $w = C \exp(-\epsilon_A/RT)$ where $\epsilon_A = 4.57A$ cal/mole is the activation energy. Further, the surface concentration of the structural units $n_s = (dN/M)^{2/3}$ (d = specific gravity). Results: The high activation

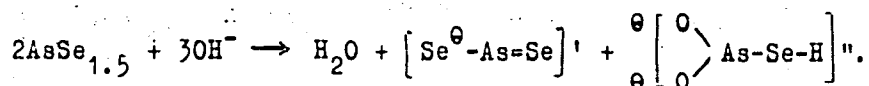
Card 1/3

Dissolving rate of glassy...

S/054/62/000/004/017/017
B101/B186

energy (15-17 kcal/mole) and the value $C/n_s \approx 10^{13} \text{ sec}^{-1}$ show that the dissolving rate of the glasses investigated depends on the rate of chemical reaction on the glass surface. The effect of the alkali concentration is expressed by $w = K(\text{NaOH})^x$, where $x = 2.2, 2.1$, and 1.5 for $\text{AsSe}_{1.25}$, $\text{AsSe}_{1.5}$, and $\text{AsSe}_{2.5}$, respectively. Hence, $w_{\text{AsSe}_{1.5}} = K(\text{OH}^-)_s^3$, where $(\text{OH}^-)_s$ is the concentration of OH ions on the glass-solution interface.

The following reaction is derived from this equation:



For $\text{AsSe}_{2.5}$, $w = K(\text{OH}^-)_s^2$ corresponding to the reaction $2\text{AsSe}_{2.5} + 2\text{OH}^- + \text{H}_2\text{O} \rightarrow \text{H}_2\text{AsSe}_4^\ominus + \text{H}_2\text{AsSeO}_3^\ominus$. In the case of $\text{AsSe}_{1.25}$, the sample was covered with a brown powder during the dissolution. This compound is micro-inhomogeneous, $\text{AsSe}_{1.5}$ is dissolved, and excess As remains undissolved.

Card 2/3

Dissolving rate of glassy...

S/054/62/000/004/017/017
B101/B186

In the case of $\text{AsSe}_{0.8}$, the dissolving rate was unsteady because visually observable crystallization occurred. There are 2 figures and 1 table.

SUBMITTED: March 11, 1962

Card 3/3

MYULLER, R.L.; BAYDAKOV, L.A.; BORISOVA, Z.U.

Electric conductance of the As - Se- Ge vitreous system. Vest.
LGU 17 no.10:94-102 '62. (MIRA 15:5)
(Glass—Electric properties) (Systems (Chemistry))

9.4310

S/080/62/035/004/007/022
D202/D301

AUTHORS: Borisova, Z. U., Myuller, R. L. and Chin Ch'eng Ts'ai

TITLE: Electroconductivity of glassy GeSe_x

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 4, 1962, 774-777

TEXT: This is a continuation of previous investigations on the dependence of the conductivity of glassy germanium selenides on the temperature at temperatures higher than 500°C . The present study was carried out in the range $26 - 34^\circ\text{C}$. The results confirmed the authors' opinion that the semiconductivity of the glassy system selenium-germanium depends on the formation of a three-dimensional lattice of co-valent bonds. All experimental details are given. There are 1 table, 2 figures and 6 Soviet-bloc references.

SUBMITTED: October 27, 1961

Card 1/1

S/058/63/000/003/059/104
A062/A101

AUTHORS: Baydakov, L. A., Borisova, Z. U., Myuller, R. L.

TITLE: Investigation of the electric conductivity of glass-like semiconductors AsSe_xGe_y

PERIODICAL: Referativnyy zhurnal, Fizika, no. 3, 1963, 14, abstract 3B94
(In collection: "Fizika", Leningrad, 1962, 24 - 26)

TEXT: The electric conductivity of the As-Se-Ge system was investigated under conditions of absence of excessive Se. There was established the additive dependence of the microhardness on the concentration of the structural assemblies. The experimental data show that the conductivity of glasses is caused mainly by the ionization of valent bonds in the structural assemblies of $\text{GeSe}_{4/2}$ and $\text{AsSe}_{3/2}$ and by the motion of the carriers along the valent bonds. At the transition from glass with 90% of $\text{AsSe}_{3/2}$ to glass with 70% of $\text{GeSe}_{4/2}$ there was observed a change in the doubled energy of mobility activation 1.8 - 2.2 eV in accordance with the previously determined values of the ionization energy of the valent bonds. The structural assemblies containing no Se had little effect

Card 1/2

Investigation of the electric conductivity of...

S/058/63/000/003/059/104
A062/A101

on the electric conductivity. For different compositions, the previously introduced modulus (abstract 3E93) was calculated. From the simplest classical considerations, the preexponential factor in the expression for the conductivity was calculated. Except for the cases of mutual blocking of the structural formations of $\text{GeSe}_{4/2}$ and $\text{AsSe}_{3/2}$, these calculations yield values approximating the experimental ones.

E. Nagayev

[Abstracter's note: Complete translation]

Card 2/2

BAYDAKOV, L.A.; BORISOVA, Z.U.; IPAT'YEVA, V.V.

Conductivity of vitreous $\text{AsSe}_x - \text{S}_x$. Vest.LGU 17 no.22:90-95
'62. (MIRA 15:12)
(Arsenic) (Vitreous materials—Electric properties)

BORISOVA, Z.U.; SHKOL'NIKOV, Ye.V.; KOZHINA, I.I.

Conductivity of crystallizing glasses $\text{GeSe}_{4,5-x}\text{As}_x$ ($x \leq 0,5$).
Vest.LGU 17 no.22:114-118 '62. (MIRA 15:12)
(Arsenic) (Vitreous materials—Electric properties)

MARKOVA, T.P.; BORISOVA, Z.U.

Dissolving rate of vitreous AsSe_xTl in alkali solutions. Vest.

LGU 17 no.22:150-155 '62.

(MIRA 15:12)

(Arsenic) (Vitreous materials) (Alkalies)

TIMOFEYEV, V.N.; BORISOVA, Z.U.

Conductivity of some vitreous $\text{As}_x\text{Se}_y\text{Ge}_2$ materials. Vest. LGU
17 no.22:155-159 '62. (MIRA 15:12)
(Arsenic) (Vitreous materials--Electric properties)

BORISOVA, Z.U.; BOEROV, A.I.

Conductivity of the vitreous system arsenic - selenium - gallium.
Vest.LGU 17 no.22:159-164 '62. (MIRA 15:12)
(Arsenic) (Vitreous materials—Electric properties)

BORISOVA, Z.U.; IL'INSKAYA, O.V.; TSZIN' CHZHAN [Chin Chang]

Dependence of the dissolving rate of vitreous AsSe on the concentration of alkali in solution. Vest.LGU 17 no.22:165-167 '62.
(MIRA 15:12)

(Arsenic) (Vitreous materials) (Alkalies)

MYULLER, R.L.; BAYDAKOV, L.A.; BORISOVA, Z.U.

Experimental data on the conductivity of the arsenic - sulfur
vitreous state system. Vest.LGU 17 no.22:77-89 '62.

(MIRA 15:12)

(Arsenic) (Sulfur) (Vitreous materials—Electric properties)

Electrical conductivity of complex vitreous semiconductors.

Z. U. Borisova.

Report presented at the 3rd National Conference on Semiconductor Compounds,
Kishinev, 16-21 Sept 1963

BORISOVA, Z.U.; TSZIN' CHEN-TSAY [Chin CH'ng-ts'ai]

Solution kinetics of the vitreous system germanium - selenium in
alkaline solution. Zhur.prikl.khim. 36 no.2:233-236 F '63. (MIRA 16:3)
(Germanium-selenium alloys) (Glass research)

L 12672-63
 EWP(q)/EWT(m)/BDS. AFFTC JD
 B/0080/63/036/003/0500/0506
 ACCESSION NH: AP3000640

54
 53

AUTHOR: Baydakov, L. A.; Borisova, Z. U.; Pronkin, A. A.

TITLE: Solution kinetics of vitreous arsenic sulfides in alkali solution

SOURCE: Zhurnal prikladnoy khimii, v. 36, no. 3, 1963, 500-506

TOPIC TAGS: solution kinetics, arsenic sulfides, activation energies, solution rate

ABSTRACT: The rates of solution of vitreous AsS sub 1.5, AsS sub 1.54, AsS sub 1.58, AsS sub 1.62, AsS sub 1.69 and AsS sub 2.5 in aqueous alkali solutions of different concentrations at temperatures from 15 - 45° were investigated. Tabulated data show an increase in solubility rate with an increase in temperature; with agitation; and with an increase in the NaOH concentration, where the rate of AsS sub 2.5, faster than for AsS sub 1.5, was explained by the dipole structure of the former and the chain-like structure for AsS sub 1.5. In the stoichiometric AsS sub 1.5 and AsS sub 2.5 (the other sulfides studied being As sub 2 S sub 3 with additions of S), the most stable and difficult to dissolve, the solubility proceeds with the formation of complex anions, hydration and finally solution. Without agitation, where activation energies are less than 10 kcal/mol, diffusion determines the rate of solution; with agitation, the effect of diffusion process is over-

Card 1/2

L 12672-63
ACCESSION NR: AP3000640

shadowed, activation energies are about 14 kcal/mol and the rate of solution determines the chemical reaction on the surface of the solid phase. In sulfides richer in S, the S settles out passivating the sample surface and not permitting reproducible results. "In conclusion [the authors] express deep appreciation to R. L. Myller for constant attention and valuable advice on the conduct of the present study." Orig. art. has: 5 tables, 3 figures, 9 equations.

ASSOCIATION: none

SUBMITTED: 5Dec61

SUB CODE: CH

DATE ACQ: 12Jun63

NO REF SOV: 010

ENCL: 00

OTHER: 003

Card 2/2

L 21141-65 EWT(m)/EWP(b)/EWP(e)/EWP(t) Pq-4/Pa-4 IJP(c) RDW/NE/JD
 S/0054/64/000/004/0094/0101
 ACCESSION NR: AP5001583

AUTHOR: Myuller, R. L. (Deceased); El'Mosli, M.; Borisova, Z. U. /B

TITLE: The effect of heat treatment on electrical conductivity and microhardness of vitreous arsenic selenides

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 4, 1964, 94-101

TOPIC TAGS: arsenic selenide, arsenic selenium system, glassy arsenic selenide, nonstoichiometric arsenic selenide, semiconductor glass, arsenic selenide heat treatment

ABSTRACT: The effect of thermal history on the semiconducting properties of the samples of nonstoichiometric glassy arsenic selenides has been studied in order to establish the regions of stability in the AsSe_x system. The samples were synthesized by conventional vacuum melting at 500 or 700C and air hardened from that temperature. Some of the melts were cooled slowly, then annealed to compare the effect of various cooling procedures. Electrical conductivity of the glasses was measured electrometrically in the 20-100C range. Microhardness

Cord 1/ 3

L 21141-65

ACCESSION NR: AP5001583

and specific gravity were also measured, and the activation of conductivity σ_0 , pre-exponential factor $\log \sigma_0$, and steric factor were calculated for AsSe , AsSe_4 , and AsSe_{20} samples. It was shown that: 1) satisfactory reproducibility of the glassy state was obtained in AsSe glasses under various conditions of heat treatment; 2) the absence of such reproducibility in AsSe_4 glasses could be explained in terms of disordered structure caused by the presence of AsSe_{15} and $\text{SeSe}_{2/2}$ structural units in comparable quantity; and 3) two glassy states can be obtained in AsSe_{20} samples by varying the conditions of synthesis and heat treatment; a reproducible state, with higher transient-type conductivity obtained by heat treatment from 700C, and a nonreproducible state with lower conductivity due to the shifting of covalent bonds, obtained by air hardening at 500—300C. Two different states of AsSe_{20} are determined by the structure of Se in excess of stoichiometry: at 700C Se is in the form of filaments and chains which contribute to the transient type of conductance; at lower temperatures the formation of Se_n rings causes a change in conductance characteristics. Orig. art. has: 4 figures and 3 tables.

ASSOCIATION: none

Corr. 2/3

L 21141-65

ACCESSION NR: AP5001583

SUBMITTED: 22Jun64

ENCL: 00

SUB CODE: IC, MT

NO REF SOV: 008

OTHER: 009

ATD PRESS: 3165

Cord 3/3

L 8708-65 EWT(1)/EPA(s)-2/EWT(m)/EWP(b) Pa-4 RAEM(t)/Pa-4 RDW/JD/WH
 ACCESSION NR: AP4044639 8/0048/64/028/008/1293/1294

AUTHOR: Borisova, Z. U.

TITLE: Effect of certain elements on the electrical conductivity
and microhardness of arsenic selenide glasses

SOURCE: AN BSSR. Izv. Soriya fizicheskaya, v. 28, no. 8, 1964,
 1293-1294

TOPIC TAGS: arsenic selenide, arsenic selenide glass, electrical
 conductivity, microhardness, impurity effect

ABSTRACT: It has been shown earlier that small amounts of impurities
 affect but little the electrical conductivity of arsenic sulfide
 and selenide glasses. The results of a systematic study of the ef-
 fect of various elements on the electrical conductivity and micro-
 hardness of arsenic selenide ($AsSe_{1.5}$) glass are described in this
 study. It is shown that: 1) small amounts (2 to 4 at%) of Be, Mg,
 Ca, Zn, Cd, B, or Ga have very little effect on the conductivity
 and microhardness of arsenic selenide glass; the addition of larger
 amounts of these elements causes crystallization of melts; 2) Hg and

Cord 1/2

I. 8708-65

ACCESSION NR: AP4044639

0

I in amounts of up to 7 and 17 at%, respectively, do not affect the electrical properties of arsenic selenide or of glass, while I lowers its microhardness slightly; 3) such elements as Tl or Ge affect considerably both the conductivity and microhardness of arsenic selenide glass. The addition of 30 at% Tl increases the conductivity of the glass by six orders of magnitude and lowers its microhardness by 20%. Ga can be added to arsenic selenide glass in amounts of up to 44 at%; the addition of Ga increases the conductivity of the glass by 3.5 orders of magnitude and increases its microhardness. A similar effect is produced by Si, Sn, and Pb. Orig. art. has: 3 tables.

ASSOCIATION: none

SUBMITTED: 00

ATD PRESS: 3112

ENCL: 00

SUB CODE: MT, EN

NO REF SOV: 002

OTHER: 002

Card 2/2

ACCESSION NR: AP4040521

8/0080/64/037/006/1217/1221

AUTHOR: Doynikov, L. I.; Il'inskaya, O. V.; Borisova, Z. U.

TITLE: Solution kinetics of vitreous AsSe_{x-y} and AsGeSe_{x-y} in alkaline solutions

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 6, 1964, 1217-1221

TOPIC TAGS: arsenic selenide, AsSe_{x-y} , AsGeSe_{x-y} , solubility, solution kinetics, stability, activation energy, frequency factor, boron selenide, vitreous arsenic selenide

ABSTRACT: The effect of boron on the solution kinetics of vitreous arsenic selenides AsSe_{x-y} and AsGeSe_{x-y} was investigated. The limit of the existence of stable (relative to air storage) AsSe_{x-y} was found to be in compositions containing up to about 9 at.% boron. The rate of solution of both AsSe_{x-y} and AsGeSe_{x-y} increased with increase in boron content; this rate is independent of rate of agitation, but increases with increased temperature and increased alkali concentration (temperature- and concentration-solution kinetics curves are included). The energy of activation was reduced from 15 to 10 kcal/mol as boron content was increased from

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1/2

ACCESSION NR: AP4040521

0.05 to 0.2 in AsSe_xBy , and from 12 to 7 kcal/mol as boron content was increased from 0.1 to 0.5 in AsGeSe_xBy . The values of the frequency factor in these compositions were also lowered in comparison to values for AsSe_x . These lowered values are explained by the relative instability of boron selenide. Orig. art. has: 5 figures, 1 formula and 3 tables.

ASSOCIATION: None

SUBMITTED: 23Jan63

ENCL: 00

SUB CODE: IC 1

NO REF SOV: 005

OTHER: 002

Card 2/2

L 14345-65 EWP(e)/EWT(m)/EWP(b) Pg-4 ASD(a)-5/AFETR/ESD(gs)/ESD(t) WH
ACCESSION NR: AP4041794 S/0080/64/037/007/1458/1462

AUTHOR: Doynikov, L. I.; Borisova, Z. U.

TITLE: Electric conductivity of vitreous $AsSe_xB_y$ and $AsGeSe_xB_y$ B

SOURCE: Zhurnal prikladnoy khimii, v. 37, no. 7, 1964, 1458-1462

TOPIC TAGS: electric conductivity, vitreous arsenic boron selenide, vitreous arsenic boron germanium selenide, arsenic selenide glass, boron, microhardness, electric conductivity energy, ionization energy, activation energy, covalent bond, boron selenium covalent bond, arsenic selenium covalent bond, germanium selenium covalent bond, glass structure

ABSTRACT: The effect of boron addition to vitreous $AsSe_x$ and $AsGeSe_x$ on their electric conductivity was investigated. Electric conductivity was measured electrometrically, and the resultant conductivity-temperature relationships were plotted for the $AsSe_xB_y$ and $AsGeSe_xB_y$ glasses. The energy of electric conductivity and the energy of ionization of the prevailing paired electron bonds were determined and found to be close in value, which indicates insignificant activa-

Card 1/3

L 14345-65

ACCESSION NR: AP4041794

tion energy. It was found that adding very small amounts of boron ($B_{0.05}$) to vitreous $AsSe_x$, when x is greater than 1.5, increased its electric conductivity by 1—2 orders without changing the electric conductivity energy; however, further boron addition produced no further change of its electric conductivity. The energy of electric conductivity of vitreous $AsSe_xB_y$ was almost the same as that of $AsSe_x$. The concentration of the covalent bonds B-Se, As-Se, and Ge-Se in the different compositions investigated was calculated. It was assumed that conductance is made possible through the basic structural units $AsSe_{3/2}$ which block other structures. Addition of boron to $AsSe_{3/2}$ did not change the value of the steric factor, but its addition to $AsSe_x$ glasses containing excess selenium increased the steric factor, indicating an increase in the continuous character of the conductivity; this can be explained by the formation of interstitial tetrahedral structures of the type $AsBSe_{5/2}$ in the Se rings and chains, thereby linking them and removing the blocking of the current carrier. It was also found that addition of a small amount of boron to vitreous $AsGeSe_x$ did not have any significant effect on its electric conductivity. "I sincerely thank R. L. Myuller for valuable advice and instruction." Orig. art. has: 3 tables and 2 figures.

Card 2/3

L 14345-65
ACCESSION NR: AP4041794

ASSOCIATION: none

SUBMITTED: 23Jan63

ENCL: 00

SUB CODE: MT, EM

NO REF SOV: 006

OTHER: 000

Card 3/3

35507-65: EMA(h)/EMT(1)/EMT(m)/EMG(m)/EMP(b)/T/EMT(e)/EMP(t) PQ-4/PZ-6/Pet
IJP(c) RDM/AT/WH/JD

ACCESSION NR: AP5008266

S/0054/65/000/001/0120/0127

AUTHOR: Shkol'nikov, Ye. V.; Borisova, Z. U.

TITLE: Electric conductivity and microhardness of the glassy and glass-crystalline arsenic selenide-lead compounds

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 1, 1965, 120-127

TOPIC TAGS: glassy alloy, glass crystalline alloy, arsenic selenide lead glass, semiconductor glass, glass electrical conductivity, glass microhardness

ABSTRACT: The effects of lead additions on the physical and semiconductor properties of glassy arsenic selenide have been studied. The $\text{AsSe}_{1.5}\text{Pb}_x$ alloys containing 0-12.0 at% Pb have been synthesized by vacuum melting at a maximum of 950C. The alloys with 0-2 at% Pb were air hardened in 5-8 min to room temperature; those with 3-5 at% were hardened in a stream of cool air (2-4 min to room temperature) or air hardened under less drastic conditions (longer time); alloys with 6-12 at% Pb were water-quenched in 1-2 min to room temperature. The x-ray data revealed the amorphous structure of alloys with 0-5 at% Pb and inclusions of the crystalline PbSe phase in alloys with 5-12 at% Pb. As the density of the alloys

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L 35507-65

ACCESSION NR: AP5008266

increased with increasing of the Pb content, crystallization, undetected by x-ray, was assumed to take place in alloys containing less than 5 at% Pb. Electrical conductivity in the 20—125°C range and microhardness of the glassy arsenic selenide were significantly affected by introducing lead, even in small amounts. Electrical conductivity decreased by a half order of magnitude in the samples containing up to 0.5 at% Pb, but increased by 3.5 orders of magnitude with an increase in the lead content from 0.5 to 5 at%. A further increase in conductivity with increasing of the lead content to 10 at% was much slower because of the appearance of a crystalline phase. The changes in calculated values of the activation energy of conductivity followed a reversed pattern. As conductivity is determined by the glassy phase, its slow increase, with the lead content of the alloys increasing over 5 at%, was attributed to the limited capacity of the glassy phase to absorb lead, which forms crystalline PbSe inclusions. A sharp increase in conductivity of the alloys with lead content over 10 at% is caused by the stop in blocking crystalline microinclusions. Conductivity of the alloy with 12% Pb is very close to that of PbSe, which is of the extrinsic type to ~70°C in both. The calculated steric factor provided evidence of a transient type of conductance in glassy arsenic selenide-lead compounds. Similarity between electronic and ionic conductance was deduced from the adherence of the chalcogenide $\text{AsSe}_{1.5}\text{M}_x$ ($\text{M} = \text{Cu}, \text{Sn}, \text{Pb}$) glasses and ionic (borate and silicate) glasses to the empiric relation $\epsilon_0[\text{M}]^{1/x} = L$. Microhardness of the glassy

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ACCESSION NR: AP5008266

alloys was maximum at 5—6 at% Pb. The decrease in microhardness with the increasing lead content was attributed to the break in continuity of the structure with appearance of the crystalline phase. Both electrical conductivity and microhardness of the $\text{AsSe}_{1.5}\text{Pbx}$ alloys were greatly altered by the difference in cooling conditions. Orig. art. has: 3 figures and 2 tables. [JK]

ASSOCIATION: none

SUBMITTED: 24Jun64

ENCL: 00

SUB CODE: MM,EM

NO REF SOV: 007

OTHER: 001

ATD PRESS: 3215

77 B
C 3/3

I 57005-65 EWP(o)/EWT(m)/EWP(w)/EWP(1)/ENG(m)/ENA(d)/T/EWP(t)/EWP(b) Pg 4
IJP(c) RDW/JD/WH

ACCESSION NR: AP5017100

UR/0054/65/000/002/0086/0090

AUTHOR: Bobrov, A. I.; Borisova, Z. U.; Kozhina, I. I.

TITLE: Effect of thallium on the electrical conductivity and microhardness of vitreous and crystalline $\text{AsSe}_{1.5}\text{Tl}_x$

SOURCE: Leningrad. Universitet. Vestnik. Seriya fiziki i khimii, no. 2, 1965, 86-90

TOPIC TAGS: arsenic selenide, electrical conductivity, crystalline phase, microhardness, vitreous arsenic selenide, vitrocrySTALLine arsenic selenide, thallium addition

ABSTRACTL The thermal treatment of easily crystallizing glasses of the AsSe_xTl_y system is not accompanied by their volume crystallization. The process of their crystallization commences from the surface and gradually spreads throughout the volume. In this connection, the authors produced and investigated vitreous, vitrocrySTALLine, and crystalline states in the $\text{AsSe}_{1.5}\text{Tl}_x$ system by gradually increasing the thallium content of alloys of arsenic selenide ($\text{AsSe}_{1.5}\text{Tl}_{0.1}$).

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ACCESSION NR: AP5017100

AsSe_{1.5}Tl_{0.5}, and so on, until AsSe_{1.5}Tl_{2.5}). These alloys were obtained by the customary method of vacuum melting of elementary arsenic, thallium, and "rectifier-class" selenium and they were brought to vitreous state by either slow cooling from 700°C or by quenching in air from 500°C to 20°C in 5 min. The examination was performed by means of X-ray phase analysis and a metallographic microscope. As the Tl content increases (AsSe_{1.5}Tl_{1.25}, AsSe_{1.5}Tl_{1.3}), the crystalline phase of As₂Se₃ begins to appear in small quantities in the glasses, and as the Tl content is further increased, elementary arsenic or Tl₂Se get segregated in crystalline state. The microhardness of the vitreous alloys decreases with increasing Tl content, up to a point. The minimum microhardness is observed in AsSe_{1.5}Tl_{1.5}, which apparently contains commensurable amounts of crystalline and vitreous phases. Any further increase in the content of crystalline phase in the alloys leads to an increase in microhardness. The addition of 32 at.% Tl to vitreous arsenic selenide increases the conductivity of glasses by as much as six orders of magnitude. The electrical conductivity of the alloys was measured by the electrometric method, using graphite contacts. It was found that the addition of thallium to vitreous arsenic selenide leads to a proportional increase in the conductivity of the glass-

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ACCESSION NR: AP5017100

ses and an attendant decrease in the energy of electrical conductivity (which falls from 1.70 ev for $\text{AsSe}_{1.5}$ to 1.07 ev for $\text{AsSe}_{1.5}\text{Tl}_{1.2}$. As the thallium content increases to 50 at.% ($\text{AsSe}_{1.5}\text{Tl}_{1.5}$, $\text{AsSe}_{1.5}\text{Tl}_{2.5}$) the crystalline Tl_2Se occlusions apparently come into contact with each other and the conduction occurs along these occlusions. Orig. art. has: 3 figures, 2 tables.

ASSOCIATION: none

SUBMITTED: 11Sep64

ENCL: 00

SUB CODE: SS, MM

NO REF SOV: 005

OTHER: 002

Cord 3/3

SHKOL'NIKOV, Ye.V.; BORISOVA, Z.U.

Electric conductivity and microhardness of vitreous and glass-
crystalline $\text{AsSe}_{1,5}\text{-Pb}_2$. Vest. LGU 20 no.4:120-127 '65.

(MIRA 18:4)

BOBROV, A.I.; BORISOVA, Z.U.; KOZHINA, I.I.

Effect of thallium on the electroconductivity and microhardness of
vitreous and glass crystal $\text{AsSe}_{1,5}\text{Tl}_x$. Vest. LGU 20 no.10:86-90 '65.
(MIRA 18:7)

L 60430-65 EWT(1)/EWP(e)/EWT(m)/EWP(1)/T/EWP(t)/EWP(b)/EWA(h) Pz-6/Pq-4/Peb
TJP(c) JD/GS/AT/JAJ/VH

ACCESSION NR: AT5017263

UR/0000/65/000/000/0075/0085

AUTHOR: Myuller, R. L.; Timofeyeva, V. N.; Borisova, Z. U.

TITLE: Study of the electrical conductivity of the arsenic - sulfur - germanium system
in the vitreous state

SOURCE: Leningrad. Universitet. Khimiya tverdogo tela (Chemistry of solids). Lenin-
grad, Izd-vo Leningr. univ., 1965, 75-85

TOPIC TAGS: arsenic compound, germanium compound, sulfur compound, glass con-
ductivity, vitreous semiconductor

ABSTRACT: A total of 164 batches of glass consisting of arsenic, sulfur, and n-type
germanium in various proportions were subjected to different types of heat treatment.
The probable chemical compositions of the melts, corresponding to the formula AsS_xGe_y ,
were calculated for 37 glasses, and are tabulated. Another table gives the composition of
the glasses together with their microhardness H, density d, and energy of electrical con-
ductivity ϵ and $\log \sigma_0$ (the latter two quantities enter into the linear relation $\log \sigma =$
 $\log \sigma_0 (-\epsilon/2kT)$). Also given are the results of calculations of the content of covalent bonds
in the glasses, electrical conductivity modulus $\log \sigma_0$, $[v]$ being the concentration of covalent

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L 60430-65

ACCESSION NR: AT5017263

bonds), and steric factor $\log f$. The appreciable scatter of the electrical conductivity data is due to the great sensitivity of the electrical conductivity to the thermal history of the various glasses. Since the properties and nature of the changes in the glasses of the As-S-Ge system are closely related to the characteristics of their chemical structure, the glasses were divided into four groups, which are discussed in detail. Analysis shows that in the system studied, the most stable glass-forming structures besides $\text{AsS}_3/2$ are: A - $\text{GeS}_4/2$ in the presence of the structural units $\text{AsS}_3/2$ and B - $\text{GeS}_2/2$ in the presence of $\text{AsAs}_3/3$. The most compact and stable glasses are given by B structures when the $\text{GeS}_2/2$ content is predominant. The structural units $\text{As}_2\text{S}_4/2$ have the smallest tendency to form compact, stable glasses. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, EM

NO REF SCV: 012

OTHER: 004

Card 2/2 *80p*

L 60431-65 EWA(h)/EWT(1)/EWT(m)/EWP(1)/EWG(m)/EWP(b)/T/EWP(e)/EWP(t) Pg. 1/
Pz-5/Peb IJP(c) AT/JAJ/WH/RLW/JD/GS UR/0000/65/000/000/0086/0092
ACCESSION NR: AT5017264

AUTHOR: Florisova, Z. U.; Timofeyeva, V. N.

TITLE: Electrical conductivity of glasses having the composition $\text{AsSe}_{1.5-x}\text{S}_x\text{Ge}_y$
1.5-x Ge sub y

SOURCE: Leningrad, Universitet, Khimiya tverdogo tela (Chemistry of solids).
Leningrad, Izd-vo Leningr. univ., 1965, 86-92

TOPIC TAGS: arsenic compound, selenium compound, sulfur compound, glass conductivity,
vitreous semiconductor

ABSTRACT: Glasses of the basic composition $\text{AsS}_{1.5}\text{Ge}_y$ were studied in which sulfur was replaced by selenium to the extent of 50 and 100%. As germanium is introduced into vitreous arsenic sulfide, the structural units $\text{AsS}_{3/2}$ disappear, while $\text{As}_2\text{S}_{4/2}$ and $\text{GeS}_{4/2}$, then GeS and elementary As are formed. The introduction of germanium into vitreous $\text{AsS}_{1.5}$ and $\text{AsSe}_{1.5}$ causes an increase in their microhardness; in $\text{AsSe}_{1.5}$ the electrical conductivity decreases and the energy of electrical conductivity increases as $\text{GeSe}_{4/2}$ units accumulate in the glass. Starting with the composition $\text{AsSe}_{1.5}\text{Ge}_{1.5}$, a rise in conductivity and a corresponding drop in the energy of conductivity are observed; the latter is due to the formation of the more readily ionizable structures GeSe. A subsequent increase

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L 60431-65

ACCESSION NR: AT5017264

in the germanium content promotes the crystallization of the glasses. Substitution of selenium for sulfur in vitreous $\text{As}_{1.5}\text{Ge}_y$ stabilizes the electrical conductivity considerably. Plots of the temperature dependence of the conductivity of $\text{AsSe}_{1.5}\text{Ge}_y$ and $\text{AsS}_{0.75}\text{Se}_{0.75}\text{Ge}_y$ are illustrated. Orig. art. has: 2 figures and 4 tables.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, EM

NO REF SOV: 007

OTHER: 000

Card

2/2

L 06284-67 EWT(m)/EWP(e)/EWP(t)/ETI IJP(c) WH/JD/JG/GD

ACC NR: AT6027139

SOURCE CODE: UR/0000/65/000/000/0090/0096

AUTHOR: Borisova, Z. U.; Bobrov, A. I.

ORG: none

TITLE: Effect of indium and gallium on the electric conductivity and microhardness of vitreous arsenic selenide

SOURCE: AN SSSR. Otdeleniye obshchey i tekhnicheskoy khimii. Issledovaniya v oblasti khimii silikatov i okislov (Studies in the field of chemistry of silicates and oxides). Moscow, Izd-vo Nauka, 1965, 90-96

TOPIC TAGS: arsenic compound, selenide, gallium compound, indium compound

ABSTRACT: $\text{AsSe}_{1.5}\text{In}_x$ alloys were synthesized, and the introduction of minute amounts of indium or gallium (up to 1.17 at. %) into vitreous arsenic selenide was found to increase its conductivity by about two orders of magnitude, and to decrease the energy of electric conductivity by 0.2 eV. The conductivity of vitreous-crystalline $\text{AsSe}_{1.5}\text{In}_x$ also increases with rising indium content. As the gallium content increases, the conductivity of vitreous-crystalline $\text{AsSe}_{1.5}\text{Ga}_x$ diminishes. The different influence of indium and gallium on the conductivity of vitreous-crystalline alloys is apparently due to a difference in the electric properties of the indium and gallium selenide formed in the glass. The microhardness of vitreous and vitreous-crystalline alloys $\text{AsSe}_{1.5}\text{In}_x$ remains virtually unchanged with rising indium content, whereas in the

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ACC NR: AT6027139

case of rising gallium content in $\text{AsSe}_{1-x}\text{Ga}_x$, it increases. In conclusion, authors express their deep gratitude to I. I. Kozhina for her x-ray measurements. Orig. art. has: 4 figures and 2 tables.

SUB CODE: 07/ SUBM DATE: 11Nov64/ ORIG REF: 018/ OTH REF: 007

Card

2/2

L 60h32-65 EWA(h)/EWT(1)/EWT(m)/EWP(1)/EWG(m)/EWP(b)/T/EWP(a)/EWP(t) Pq..h/
Pz-6/Feb LJP(c) RIW/AT/JAJ/WH/JD/GS

ACCESSION NR: AT5017265

UR/0000/65/000/000/0093/0097

AUTHOR: Dobynikov, L. I.; Borisova, Z. U.

TITLE: Effect of certain impurities on the electrical conductivity of arsenic selenides

SOURCE: Leningrad. Universitet. Khimiya tverdogo tela (Chemistry of solids).
Leningrad, Izd-vo Leningr. univ., 1965, 93-97

TOPIC TAGS: glass conductivity, arsenic selenide, vitreous semiconductor, charge carrier

ABSTRACT: The effect of impurities (metals of group II of the periodic system - Be, Mg, Ca, and Zn, Cd, and Hg in amounts of 1 to 7 at. %) on the electrical conductivity of vitreous arsenic selenides was studied. The density and microhardness of the glasses obtained were measured, and the electrical conductivity was measured as a function of temperature. The introduction of impurities had no appreciable effect on the change in conductivity ($-\log \sigma_{20C}$) or energy of conductivity ϵ ; it caused only a change in the preexponential statistical coefficient $\log \sigma_0$. From the latter, values of the log of the steric factor $\log f$: $\log \sigma_0 - 4.6$ were calculated, $[v]$ being the concentration of covalent bonds. The introduction of metals of group II caused a marked increase in $\log \sigma$, apparently because the charge carriers are able to move more freely in arsenic selenides. Orig. art. has:

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L 60432-65

ACCESSION NR: AT5017265

1 figure and 2 tables.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, EM

NO REF SOV: 007

OTHER: 001

KC
Cord 2/2

I 60429-65 EWP(e)/EWT(m)/EWP(i)/EWG(m)/EWP(t)/EWP(b) Pq-4 IJP(c) RDW/JD/
 GS/JAJ/VH

ACCESSION NR: AT5017266

UR/0000/65/000/000/0098/0103

AUTHOR: Borisova, Z. U. ; Pazin, A. V.

30
B+1

TITLE: Study of the vitreous system arsenic - selenium - germanium

SOURCE: Lenigrad. Universitet. Khimiya tverdogo tela (Chemistry of solids).
Lenigrad, Izd-vo Leningr. univ., 1965, 98-103

TOPIC TAGS: arsenic compound, selenium compound, germanium compound, glass conductivity, vitreous semiconductor

ABSTRACT: The region of glass formation on the triangular phase diagram of the system Sb - Se - Ge and the electrical conductivity, density, and microhardness of the vitreous $SbSe_xGe_y$ alloys were determined. Graphically calculated values of the energy of electrical conductivity E_a and of the preexponential coefficient $\log \sigma_0$ are tabulated. A comparison of the glasses $SbSe_{3.0}Ge_{1.0}$ and $AsSe_{3.0}Ge_{1.0}$ shows that the substitution of antimony for arsenic causes an increase in conductivity amounting to over three orders of magnitude, while the energy of conductivity decreases only slightly; at the same time, the preexponential statistical coefficient $\log \sigma_0$ and the modulus of electrical conductivity $\log \sigma$ (where $[v]$ is the

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ACCESSION NR: AT5017266

concentration of covalent bonds) increase. The value of the steric factor $\log f$ approaches the theoretical value. In the region of readily crystallizing compositions obtained in the vitreous state by quenching the air, the crystallization of two compositions containing 55 at. % Se was studied: the crystallization of the glass $\text{SbSe}_2.0\text{Ge}_0.6$ occurs at a measurable rate at 300-350C, and that of the glass $\text{SbSe}_2.5\text{Ge}_1.0$, at 300-400C. In both cases, the crystallization begins at the surface, gradually spreads over the entire volume, and is not homogeneous in character. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, EM

NO REF SOV: 009

OTHER: 001

Card 2/2 *ESP*

L 60424-65 EWP(e)/EWT(m)/EWP(i)/EWG(m)/EWP(t)/EWP(b) Pg-4 IJP(c) RDW/JD/
 ACCESSION NR: AT5017267 GS/JAJ/WH UR/0000/65/000/000/0104/0113

AUTHOR: Doynikov, L. I.; Borisova, Z. U.

29
 8+1

TITLE: Glass formation and chemical stability in the system As - Se - I

SOURCE: Leningrad. Universitet. Khimiya tverdogo tela (Chemistry of solids).
 Leningrad, Izd-vo Leningr. univ., 1965, 104-113

TOPIC TAGS: arsenic compound, selenium compound, iodine compound, glass formation,
 glass solubility

ABSTRACT: The region of glass formation in the As - Se - I system and the chemical stability of the glasses $AsSe_{1.5}I_y$ and $AsSe_{2.4}I_y$ were determined. The glasses were prepared from elemental As, Se, and I by vacuum fusion. The rate of dissolution of the glasses was investigated at 20, 30, 40, and 50°C in 0.25, 0.35, 0.50 and 0.75 N NaOH solutions, with and without stirring. The data led to the conclusion that the glass reacts with the solution by means of the relatively weak I-Se bonds; colloidal-type particles are detached from the surface of the glass and hinder the access of hydroxyl ions, but stirring removes these particles and causes the glass to dissolve completely. When iodine is introduced into $AsSe_{2.4}$, which consists of $AsSe_{1.5}$ structural units and chains of excess selenium, it penetrates into the latter, shortening them and thus facilitating dissolution in

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L 60424-65

ACCESSION NR: AT5017267

the alkali. The activation energy of dissolution ξ_A and the preexponential statistical coefficient C_e in the empirical relation $w = C_e \exp\left(-\frac{\xi_A}{RT}\right)$ were calculated and found to decrease upon introduction of iodine into $AsSe_1$, 5 and $AsSe_2$, 4. Orig. art. has: 8 figures, 3 formulas and 3 tables.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, GC

NO REF SOV: 008

OTHER: 006

Card 2/2 *dlp*

L 60422-65 EWT(1)/EWP(e)/EWT(m)/EWP(1)/ENG(m)/T/EWP(t)/EWP(b)/EWA(h) Pz-6/
Pg-4/Feb IJP(c) RDM/JD/GS/AT/WH
ACCESSION NR: AT5017268 UR/0000/65/000/000/0114/0118

AUTHOR: Dovnikov, L. I.; Borisova, Z. U.

TITLE: Electrical conductivity of vitreous AsSe sub x I sub y

SOURCE: Leningrad. Universitet, Khimiya tverdogo tela (Chemistry of solids).
Leningrad, Izd-vo Leningr. univ., 1965, 114-118

TOPIC TAGS: glass conductivity, arsenic compound, selenium compound, iodine compound, vitreous semiconductor

ABSTRACT: The electrical conductivity of the glasses AsSe_xI_y (where $x = 1.5, 2.4$, and 4.0 , and $y = 0.001$ to 0.60) was found to have similar values at 20°C (between 10^{-10} and $10^{-12} \text{ ohm}^{-1} \text{ cm}^{-1}$). Thus, substantial changes in iodine content do not cause much change in the conductivity. Addition of iodine to arsenic selenides causes an increase in conductivity which is greater the higher the selenium content. This is due to the fact that iodine penetrates into the chains and rings formed by excess selenium and, by rupturing them, facilitates the passage of the majority carriers. For this reason, the introduction of iodine into $\text{AsSe}_{1.5}$ and $\text{AsSe}_{2.4}$ first causes an increase in electrical conductivity, then a decrease due to the breakdown of the basic structure. Values of the energy of conductivity $\mathcal{E}$, and frequency factor $\mathcal{C}$ were determined graphically, and values of the conductivity

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L 60422-65

ACCESSION NR: AT5017268

modulus and steric factor were also calculated. The conductivity and microhardness data confirm the probability of the formation of ordered continuous polymeric structures and rings. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, EM

NO REF SOV: 004.

OTHER: 001

Card 2/2 *SLP*

EL'MOSLI, M.; BORISOVA, Z.U.

Stabilization of the conductivity of vitreous selenium. Vest.
LGU 20 no.16:147-150 '65. (MIRA 18:9)

L 60423-65 EWT(1)/EWP(e)/EWT(m)/EWP(1)/EWG(m)/T/EWP(t)/EWP(b)/EWA(h) Pz-5/
Pq-4/Feb IJP(c) RDW/JD/GS/AT/JAJ/VMI

ACCESSION NR: AT5017269

UR/0000/65/000/000/0119/0124

AUTHOR: Borisova, Z. U.; Chernova, G. A.

42
371

TITLE: Electrical conductivity of the vitreous system $\frac{As}{27} - \frac{S}{27} - \frac{Se}{27}$

SOURCE: Leningrad. Universitet. Khimiya tverdogo tela (Chemistry of solids).
Leningrad, Izd-vo Leningr. univ., 1965, 119-124

TOPIC TAGS: arsenic compound, sulfur compound, selenium compound, glass conductivity, vitreous semiconductor 21

ABSTRACT: The temperature dependence of the electrical conductivity in the As - S - Se system was studied in compositions containing excess selenium and sulfur in the region of the vitreous state. The specimens were subjected to different types of heat treatment, and the electrical conductivity, microhardness, density, and limits of light absorption were measured. Analysis of the microhardness, energies of conductivity and steric factors $\log \rho$ led the authors to the conclusion that the glasses can be divided into two groups: (1) Glasses without excess sulfur and with negative values of $\log \rho$ (due to an impairment of the valence-coordination periodicity of the various structural units and to the predominance of a chain-ribbon structure of $AsS_{3/2}$); this group is characterized by the closeness of ener-

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ACCESSION NR: AT5017269

gies ξ_a and ξ_v , which indicates a low activation energy of electrical conductivity ($\xi_v = 0.05-0.1$ eV). (2) Glasses containing excess sulfur and selenium, in which ξ_a and ξ_v differ considerably, indicating a relatively large activation energy, which in this case corresponds to the transformation energy ξ_t of the covalent bonds. The value of $\log \rho$ corresponds to the entropy of activation and ranges from +4 to +16. The properties of the glasses of the second group are determined mainly by the structural characteristics of sulfur. Orig. art. has: 2 figures and 2 tables.

ASSOCIATION: None

SUBMITTED: 02Mar65

ENCL: 00

SUB CODE: MT, EM

NO REF SOV: 005

OTHER: 001

Cord 2/2 *slap*